

ChatGPT: The doctor's assistant?

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Received: August 30, 2023; Accepted: November 7, 2023; Published Online: November 13, 2023; <https://doi.org/10.59717/j.xinn-med.2023.100034>

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Citation: Yin C., Zheng J., Liu J., et al., (2023). ChatGPT: The doctor's assistant? The Innovation Medicine 1(3), 100034.

ChatGPT, developed by OpenAI, is an advanced chatbot program that utilizes natural language processing (NLP) and artificial intelligence to facilitate interactive conversations between users and computers.¹ It demonstrates exceptional capabilities in understanding and learning human language, enabling communication closely mimicking human conversation. Through its NLP capabilities and sophisticated algorithms, ChatGPT streamlines labor-intensive tasks, including research and medical literature summarization and evaluation. In a study by T.H. Kunge *et al.*² ChatGPT achieved or surpassed the threshold set by the United States Medical Licensing Exam

(USMLE) without requiring specialized training or reinforcement.

However, there are many limitations of ChatGPT in terms of ethics, medical writing, education, and attribution of responsibility for diagnosis and treatment. ChatGPT's response relies heavily on the dataset's quality and cannot be checked for inaccurate facts or logic. ChatGPT didn't reliably provide accurate information about surveillance and diagnosis in departments such as general surgery, thoracic surgery, and ophthalmology. This paper aims to briefly describe the advantages of ChatGPT and examine the limitations of incorporating ChatGPT in the medical field (Figure 1).

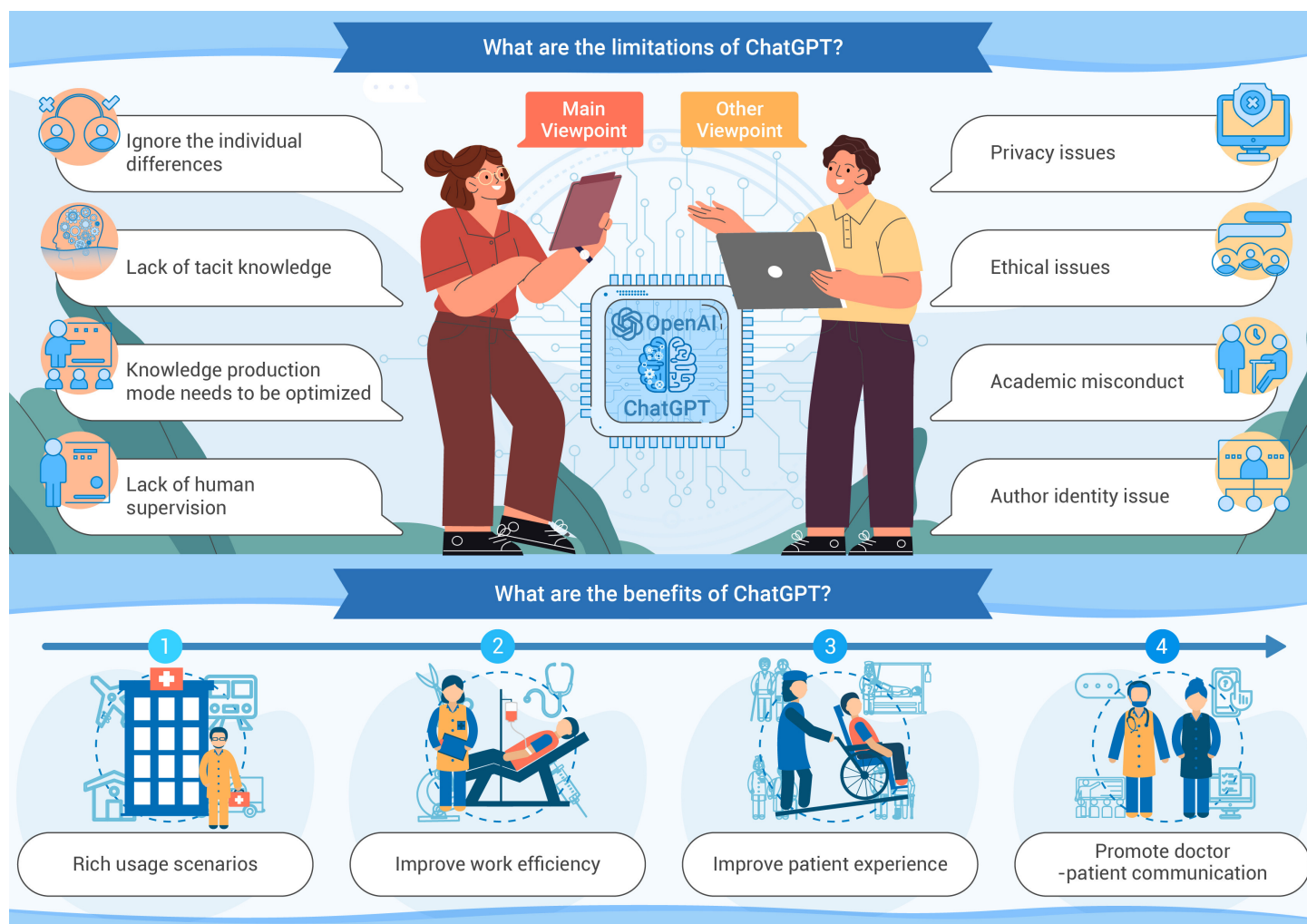


Figure 1. The limitations and benefits of ChatGPT

For physicians, ChatGPT presents notable advantages in medical record management, medical knowledge acquisition, and medical consultation.³ Firstly, it enhances workflow efficiency and patients' healthcare experience by generating medical records based on doctor-patient interactions in various formats. Secondly, leveraging its extensive training on vast public data, Chat-

GPT possesses a wealth of medical knowledge that physicians can use in multiple medical scenarios, including consultations, diagnoses, and teaching. Thirdly, ChatGPT exhibits significant potential in medical education. Its ability to rapidly retrieve information on diverse medical topics makes it a valuable virtual teaching assistant. It can address inquiries and explain anatomy,

histology, and other medical subjects in an accessible and understandable manner.

For patients, ChatGPT is a valuable tool in facilitating communication between healthcare providers and individuals seeking medical guidance. Firstly, it empowers patients to develop a more comprehensive understanding of their medical diagnoses and proposed treatments, alleviating their conditions' apprehension and uncertainty. Secondly, ChatGPT's ability to offer essential medical insights and suggest therapeutic alternatives proves particularly beneficial for individuals who may need to become more familiar with medical terminology. Thirdly, patients can conveniently access ChatGPT using a mobile device, enabling them to obtain health information or engage in disease diagnosis at any time and from any location.

Modern medicine is gradually developing towards the direction of precision medicine. The diagnosis and treatment must be individualized and pay attention to individual differences. This requires doctors to have rich clinical experience and be able to make different responses to different patients, which is also called tacit knowledge. Tacit knowledge is opposed to formal, codified, or explicit knowledge, which is knowledge that is difficult to express or extract, this can include motor skills, personal wisdom, experience, insight, and intuition. However, ChatGPT is usually trained on a large amount of data to derive general recommendations, which ignores the individual differences of patients to a certain extent and is not in line with the development requirements of precision medicine. Firstly, precision medicine has gained significance with medical advancements, necessitating consideration of individual patient differences in medical decision-making and treatment implementation. Diagnosis and treatment approaches should be based on the reasonable selection of the patient's unique genetic, molecular, or cytological information. Clinical practice often deviates from clinical practice guidelines, making it difficult for ChatGPT to adapt to such variations. Physicians usually form a kind of tacit knowledge through the accumulation of experience and intuition-based expertise. Knowledge production and innovation are based on tacit knowledge, and ChatGPT still needs help. On the one hand, ChatGPT occasionally generates unverified information, as it utilizes a text production method that reuses, reshapes, and recombines training data to answer new questions, potentially compromising the authenticity and reliability of the responses. This can lead to misinterpretations by physicians and patients. On the other hand, ChatGPT involves adjusting system parameters and interpreting diagnosis results or treatment plans. Due to the critical nature of the medical practice, products and technologies used in clinical settings are subject to strict regulations. The current AI regulations, primarily focused on conventional AI models, may not adequately address the unique challenges posed by emerging AI technologies like ChatGPT. ChatGPT still needs clinicians and regulatory supervision simultaneously, the intellectual production capacity needs to be improved, and the distance to replace the doctor's level is still a long way to go.

Besides, there are also some challenges to using ChatGPT in medicine. For example, safeguarding medical information is crucial, considering its highly sensitive and personal nature. Medical information encompasses personal details, medical history, and health records, and unauthorized disclosure or theft of such information can significantly harm patients. The vast amount of data accessible to ChatGPT raises ethical and privacy concerns. Data privacy and security concerns may arise if sensitive data is exchanged or stored within the ChatGPT system. Additionally, the use of ChatGPT in scientific writing can constitute scientific misconduct. Texts generated by ChatGPT often contain fabricated content, rendering them unsuitable for acceptance by high-quality journals. ChatGPT cannot be employed for scientific writing, including creating figures, images, or graphics, and cannot be listed as an

author.⁴

Introducing new technologies has consistently challenged and reshaped people's cognitive frameworks throughout history, occasionally eliciting initial concerns. Nevertheless, the trajectory of historical development has demonstrated the necessity of human regulation in guiding technological progress. Current research aims to compare the capabilities of ChatGPT and medical experts in delivering evidence-based medicine. In most cases, ChatGPT can provide answers that align with strong recommendations from the highest-quality evidence. Its advice is rooted in the latest scientific knowledge and adheres to expert guidelines and treatment protocols. ChatGPT's responses align highly with evidence-based medicine (EBM) despite needing more specific training on medical databases.⁵ However, it is crucial to recognize that ChatGPT is not a genuine physician, and medical treatment is a holistic process that incorporates individualized diagnosis and treatment decisions made by doctors, integrating factors such as medical history, physical examination, imaging, laboratory tests, and molecular biology. While ChatGPT can offer evidence-based answers to questions, it needs more depth of genuine clinical experience and judgment. Therefore, in clinical practice, the role of ChatGPT should be viewed as a supportive tool, with final decisions resting in the hands of doctors.

While the research demonstrates an overall optimistic trend, implementing artificial intelligence (AI) in diagnostic procedures requires regulation by medical practitioners and physicians. Researchers must actively engage in interdisciplinary research to develop ChatGPT, particularly by integrating clinical medicine and molecular biology datasets, optimizing algorithms and data quality, and conducting prospective multicenter studies emphasizing individualized treatment approaches within precision medicine. These efforts are essential to ensure that AI can make significant medical advancements. Additionally, regulations should be reinforced to establish standardized guidelines for using ChatGPT in the medical domain. This will enable AI to contribute to the progress of medicine and the well-being of humanity. Notably, developing an AI model trained on comprehensive medical databases can further enhance the quality and accuracy of responses, leading to a transformative medical revolution.

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FUNDING AND ACKNOWLEDGMENTS

This work was supported by an independent research project of the Medical Engineering Laboratory of Chinese PLA General Hospital (grant number 2022SYSZZKY26). The funder had no role in study design, data collection and analysis, decision to publish or preparation of the manuscript.

DECLARATION OF INTERESTS

The authors declare no competing interests.